

Can We Assess Ecosystem Pressures on the Puget Sound?

Identifying and assessing pressures¹ is a key step in Puget Sound Partnership's strategy for setting restoration priorities. For example, the Action Agenda is organized in terms of key pressures (Question 2) and what actions are needed to reduce these pressures (Questions 3 and 4). As the Science Panel noted in its "Conclusions Regarding Action Agenda Implications of the Puget Sound Science Update":

There is an urgent need to continue to conduct a comprehensive analysis of threats [sic]...The PSP needs to sanction and help find funding for this work as soon as possible in time for crafting the next Action Agenda, while at the same time supporting the longer term development of synthetic models and other tools that allows us to better understand the way the natural and human systems work across the entire ecosystem.

In the next month, Partnership staff needs guidance from the Science Panel on how or whether to conduct a pressure assessment to inform the release of a draft Action Agenda by July 2011.

1. Can we use the Open Standards' pressure ranking approach? If so, does it need to be modified?

Open Standards pressure rating approach is based on laying out the conceptual model associated with the relationships between strategies, pressures (called "threats" in Open Standards jargon. Figure 1), and key ecological attributes (KEAs) of focal ecosystem components (called "targets" below, Figure 1) and rating the impact of the pressure based on the key ecological attributes of each focal ecosystem component.

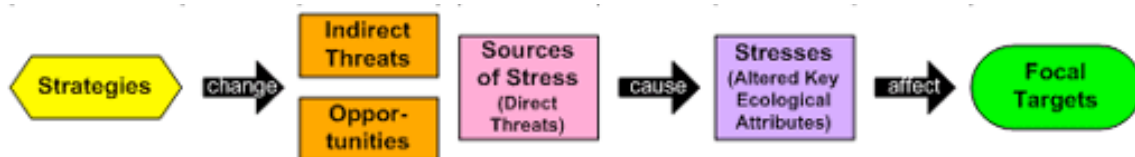


Figure 1. Conceptual model linking recovery strategies, pressures, stresses, and focal ecosystem components.

Pressures are ranked based on their severity, scope, and irreversibility, which are defined as

¹ Sources and stressors associated with ecosystem stress

- 1) Scope – generally defined spatially as a proportion of the components that can reasonably be expected to be affected by the pressure within ten years given the continuation of current circumstances and trends. In terms of measuring this, the following generally applies: for ecosystems and ecological communities, this can be measured as the proportion of the target's occurrence. For those components that are species, this can be measured as the proportion of the component's population.
- 2) Severity – generally defined as the level of damage to the components from the pressure that can reasonably be expected given the continuation of current circumstances and trends. This can be measured in terms of the following: for ecosystems/ecological communities – as the degree of destruction or degradation of the component within the scope of the project; and for species – as the degree of reduction of the component population within the scope.
- 3) Irreversibility – generally defined as the degree to which the effects of a pressure can be reversed and the component restored, if the pressure no longer exists.

Ranking is qualitative based four categories: “very high”, “high” “medium” or “low” which are defined by a range of impact.

Example: Definition of Pressure Ratings for Scope of Impact

Very High: Likely to be pervasive in its scope, affecting the target across all or most (71-100%) of its occurrence/population.

High: Likely to be widespread in its scope, affecting the target across much (31-70%) of its occurrence/population.

Medium: Likely to be restricted in its scope, affecting the target across some (11-30%) of its occurrence/population.

Low: Likely to be very narrow in its scope, affecting the target across a small proportion (1-10%) of its occurrence/population

Ratings for scope, severity, and irreversibility are combined to produce an overall rating. This process considers the scope and severity to carry more weight than irreversibility because together they provide a sense of the magnitude to the pressure. This approach does not explicitly capture uncertainty as part of the process. Uncertainty can be documented where it is known.

Previous Experience with this Approach

In 2009, the Partnership conducted a pressure ranking at the Puget Sound scale with a set of pressures. The Partnership received criticism for both the approach to the ranking and the suite of pressures that were ranked. The criticism predominately focused on the following items:

Approach to Ranking

- 1) Lack of appropriate experts involved in the process;
- 2) Lack of consistent and clear documentation of the assumptions and uncertainties involved in the ranking;
- 3) Lack of a suite of defined KEAs for the components and therefore a lack of a clear relationship between how the pressure impacts the component;
- 4) Lack of a consistent and standardized approach for conducting the ranking across the pressures. This includes how legacy effects were addressed and how current regulations/funding were related to current level of pressure; and
- 5) Regional ranking of pressure rather than a local ranking that was then rolled-up in order to provide a greater level of precision.

Suite of Pressures

- 1) Categories of pressures in terms of what was split and what was lumped together; and
- 2) Definitions of pressures that incorporated presumptions about the rating of the pressure

2. Questions for consideration:

- 1) If the process for pressure ranking were redone, can we address these issues in a way that advances our technical understanding of pressures? Is this an appropriate first step? Or, does this need to be modified?
- 2) If the Open Standards methodology is not adequate for now, what are the alternative methodologies that could be applied? What would that process look like? (Note - We need to be able to judge whether we have the tools and capacity to use these given time constraints for developing the Action Agenda).
- 3) What kinds of tools should we be developing now to advance a more synthetic, probabilistic approaches? (Note - This might be a priority for revising the Biennial Science Work Plan that is part of the Action Agenda).